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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/773,191	02/09/2004	Kia Silverbrook	MTB21US	8430
24011	7590	08/01/2006	EXAMINER	
SILVERBROOK RESEARCH PTY LTD 393 DARLING STREET BALMAIN, NSW 2041 AUSTRALIA			CHOI, HAN S	
			ART UNIT	PAPER NUMBER
			2853	

DATE MAILED: 08/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/773,191

**Applicant(s)**

SILVERBROOK, KIA

**Examiner**

Han S. Choi

**Art Unit**

2853

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 08 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-54 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) See Continuation Sheet is/are rejected.
- 7) ☒ Claim(s) 2,3,9,12,15,17,20,21,28,31,34,36,39,40,45,48,51 and 53 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 6/8/06.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

Continuation of Disposition of Claims: Claims rejected are 1,4-8,10,11,13,14,16,18,19,22-27,29,30,32,33,35,37,38,41-44,46,47,49,50,52 and 54.

)

## **DETAILED ACTION**

### ***Terminal Disclaimer***

1. The terminal disclaimer filed on 6/8/06 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of USSN 10/728779 has been reviewed and is accepted. The terminal disclaimer has been recorded.

### ***Response to Arguments***

2. Applicant's arguments with respect to claims 1, 19, and 38 have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Objections***

3. The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

Misnumbered claims 51-53 have been renumbered 52-54.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 4-6, 13, 14, 19, 22, 25, 26, 32, and 33 are rejected under 35 U.S.C. 102(b) as being anticipated by Silverbrook (US Pat. 6,315,200).

Referring to claims 1, 14, 19, and 33 :

- a plurality of structures laminated together (different layers united together), one of the structures being a printhead [44] in [Col. 249, Lines 11-14] shown in Fig. 206.
- a plurality of nozzles in [Col. 250, Line 28].
- a plurality of heater elements in [Col. 264, Lines 53-58]
- a plurality of ejectable liquid inlets [812] in fluid connection with the nozzles, the inlets [812] and nozzles being micron-sized (the printhead is designed to be 0.5 micron chip, hence the inlets and nozzles must be micron-sized, furthermore "micron-sized" can indicate anything measurable in microns) in [Col. 265, Lines 32-34].
- heating the heater element above the boiling point of the bubble forming liquid forms a gas bubble that causes the ejection of a droplet of the ejectable liquid from the nozzle (ink forms a bubble when boiled) in [Col. 264, Lines 60-62]

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- the remaining structures including a plurality of passages [836, 837, 838, 839, 840, 842] for the ejectable liquid, the passages [836, 837, 838, 839, 840, 842] extending from the ejectable liquid inlets [812] on the printhead [44] in [Col. 249, Lines 52-62] to openings [826, 827] configured for connection an ejectable liquid supply in [Col. 250, Lines 36-38], the openings [826, 827] being substantially larger than the inlets [812] shown in Figs. 206-210.
- adjacent structures within the laminated structure are laminated together so that the passages funnel the ejectable liquid from the openings [826, 827] to the ejectable liquid inlets [812] of the printhead [44] shown in Fig. 206.

Referring to claims 4 and 22:

- the printhead is formed using lithographically masked etching techniques (does not limit the structure)

Referring to claims 5 and 25:

- the bubble forming liquid and the ejectable liquid are of a common body of liquid in [Col. 264, Lines 57-65]

Referring to claims 6 and 26:

- configured to print on a page and to be a page-width printhead in [Col. 12, Lines 37-45].

Referring to claims 13 and 32:

- a structure that is formed by chemical vapor deposition (CVD), the nozzles being incorporated on the structure (the method of forming by chemical vapor deposition (CVD) does not limit the structure).

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 7, 11, 18, 23, 27, 30, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Silverbrook (US Pat. 6,315,200) in view of Kubby (US Pat. 5,706,041).

Silverbrook discloses the basic elements of the claimed invention except for the heater element is in the form of a cantilever beam and suspended in the bubble forming liquid, the heater element has two opposite sides and is configured such that a said gas bubble formed by that heater element is formed at both of said sides of that heater element, and wherein each heater element is substantially covered by a conformal protective coating, the coating of each heater element having been applied substantially to all sides of the heater element simultaneously such that the coating is seamless.

Referring to claims 7, 23, and 27, Kubby teaches the heater element [20 and 22] is suspended parallel to the nozzle in the bubble forming chamber [16] (also cantilevered) in [Col. 3, Lines 53-55] shown in Figs. 1 and 2. Referring to claims 11 and 30, Kubby teaches each heater element [20 and 22] has two opposite sides and is configured such that a said gas bubble formed by that heater element [20 and 22] is formed at both of said sides of that heater element [20 and 22] in [Col. 4, Lines 59-63].

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Referring to claims 18 and 37, Kubby teaches wherein each heater element is substantially covered by a conformal protective coating, the coating of each heater element having been applied substantially to all sides of the heater element simultaneously such that the coating is seamless in [Col. 4, Lines 32-50] shown in Fig.

4.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the elements taught by Kubby to the printhead of Silverbrook for the purpose of causing nucleation of a relatively large bubble and protecting the heater in [Col. 4, Lines 61-63].

8. Claims 8 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Silverbrook (US Pat. 6,315,200) in view of Silverbrook (US Pat. 5,841,452).

Silverbrook ('200) discloses the basic elements of the claimed invention except for the heater element configured such that an actuation energy of less than 500 nanojoules is required to heat the heater element sufficiently to form a bubble to cause the ejection of a drop.

Silverbrook ('452) teaches that reducing heater energy reduces power dissipation without affecting print speed, and that typically 200 nanojoules is required to eject a drop by heating the heater element in [Col. 18, Lines 15-18].

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to utilize a heating element heated to a heating energy of



200 nanojoules in the printhead of Silverbrook ('200) for the purpose of maintaining print speed while reducing power dissipation.

9. Claims 10 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Silverbrook (US Pat. 6,315,200) in view of Feinn et al. (US Pat. 6,543,879).

Silverbrook discloses the basic elements of the claimed invention except for a nozzle density greater than 10000 nozzles/cm<sup>2</sup>.

Feinn et al. teaches in [Col. 2, Lines 1-14] a nozzle packing density of at least 100 nozzles/mm<sup>2</sup> or 10000 nozzles/cm<sup>2</sup> when converted to square centimeters.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the printhead of Silverbrook with a nozzle density above 10000 nozzles/cm<sup>2</sup> for the purpose of accommodating higher printing resolutions and to improve the printhead drop generation rate in [Col. 1, Lines 57-61].

10. Claims 16 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Silverbrook (US Pat. 6,315,200) in view of Chan (US Pat. 5,710,070).

Silverbrook discloses the basic elements of the claimed invention except for a heater element formed of solid material of which more than 90% of which, by atomic proportion, is constituted by at least one periodic element having an atomic number below 50.

Chan teaches a thermal inkjet printhead comprising a resistive layer composed of titanium nitride, which forms a resistor and a contact metal barrier layer in [Col. 2, Lines 10-14]. Titanium has an atomic number less than 50 on the periodic table.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the titanium nitride resistor to the printhead of Silverbrook for the purpose of having resistors that are more reliable, especially at higher temperatures and less complicated to manufacture in [Col. 2, Lines 1-2].

11. Claims 38, 41-43, 49, and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Silverbrook (US Pat. 6,315,200) in view of Fukuchi et al. (US Pat. 4,549,191).

Silverbrook discloses the basic elements of the claimed invention in the (see rejection in paragraph 5) except for supplying the nozzle with a replacement volume of the ejectable liquid equivalent to the ejected drop.

Fukuchi et al. teaches replacing an amount equal in volume to the ink that was ejected from the nozzles in [Col. 1, Lines 35-38].

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the teaching of Fukuchi et al. with the printhead of Silverbrook for the purpose of preventing ink degeneration in the pressure chamber in [Col. 3, Lines 51-58].

12. Claim 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over Silverbrook (US Pat. 6,315,200) in view of Fukuchi et al. (US Pat. 4,549,191) as applied to claims 38, 41-43, and 50 above, and further in view of Silverbrook (US Pat. 5,841,452).

Silverbrook ('200) in view of Fukuchi et al. discloses the basic elements of the claimed invention except for the heater element configured such that an actuation energy of less than 500 nanojoules is required to heat the heater element sufficiently to form a bubble to cause the ejection of a drop.

Silverbrook ('452) teaches that reducing heater energy reduces power dissipation without affecting print speed, and that typically 200 nanojoules is required to eject a drop by heating the heater element in [Col. 18, Lines 15-18].

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to utilize a heating element heated to a heating energy of 200 nanojoules in the printhead of Silverbrook ('200) in view of Fukuchi et al. for the purpose of maintaining print speed while reducing power dissipation.

13. Claim 46 rejected under 35 U.S.C. 103(a) as being unpatentable over Silverbrook (US Pat. 6,315,200) in view of Fukuchi et al. (US Pat. 4,549,191) as applied to claims 38, 41-43, and 50 above, and further in view of Feinn et al. (US Pat. 6,543,879).

Silverbrook in view of Fukuchi et al. discloses the basic elements of the claimed invention except for a nozzle density greater than 10000 nozzles/cm<sup>2</sup>.

Feinn et al. teaches in [Col. 2, Lines 1-14] a nozzle packing density of at least 100 nozzles/mm<sup>2</sup> or 10000 nozzles/cm<sup>2</sup> when converted to square centimeters.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the printhead of Silverbrook in view of Fukuchi et al. with a nozzle density above 10000 nozzles/cm<sup>2</sup> for the purpose of accommodating higher printing resolutions and to improve the printhead drop generation rate in [Col. 1, Lines 57-61].

14. Claims 47 and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Silverbrook (US Pat. 6,315,200) in view of Fukuchi et al. (US Pat. 4,549,191) as applied to claims 38, 41-43, and 50 above, and further in view of Kubby (US Pat. 5,706,041).

Silverbrook in view of Fukuchi et al. disclose the basic elements of the claimed invention except for the heater element has two opposite sides and is configured such that a said gas bubble formed by that heater element is formed at both of said sides of that heater element, and wherein each heater element is substantially covered by a conformal protective coating, the coating of each heater element having been applied substantially to all sides of the heater element simultaneously such that the coating is seamless.

Referring to claim 47, Kubby teaches each heater element [20 and 22] has two opposite sides and is configured such that a said gas bubble formed by that heater element [20 and 22] is formed at both of said sides of that heater element [20 and 22] in

[Col. 4, Lines 59-63]. Referring to claim 53, Kubby teaches wherein each heater element is substantially covered by a conformal protective coating, the coating of each heater element having been applied substantially to all sides of the heater element simultaneously such that the coating is seamless in [Col. 4, Lines 32-50] shown in Fig. 4.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the elements taught by Kubby to the printhead of Silverbrook in view of Fukuchi et al. for the purpose of causing nucleation of a relatively large bubble and protecting the heater in [Col. 4, Lines 61-63].

15. Claim 52 is rejected under 35 U.S.C. 103(a) as being unpatentable over Silverbrook (US Pat. 6,315,200) in view of Fukuchi et al. (US Pat. 4,549,191) as applied to claims 38, 41-43, and 50 above, and further in view of Chan (US Pat. 5,710,070).

Silverbrook in view of Fukuchi et al. disclose the basic elements of the claimed invention except for a heater element formed of solid material of which more than 90% of which, by atomic proportion, is constituted by at least one periodic element having an atomic number below 50.

Chan teaches a thermal inkjet printhead comprising a resistive layer composed of titanium nitride, which forms a resistor and a contact metal barrier layer in [Col. 2, Lines 10-14]. Titanium has an atomic number less than 50 on the periodic table.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the titanium nitride resistor to the printhead

of Silverbrook in view of Fukuchi et al. for the purpose of having resistors that are more reliable, especially at higher temperatures and less complicated to manufacture in [Col. 2, Lines 1-2].

***Allowable Subject Matter***

16. Claims 2, 3, 9, 12, 15, 17, 20, 21, 28, 31, 34, 36, 39, 40, 45, 48, 51, and 53 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

17. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Han S. Choi whose telephone number is (571) 272-8350. The examiner can normally be reached on Monday - Friday, 8:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HSC  
7/21/06



**STEPHEN MEIER**  
**SUPERVISORY PATENT EXAMINER**